Reprint of Article from the Scientific American, March 1924 Issue.

The Gelatine You Eat

How the Pure Food Laws Restrict the Raw Materials of Which It Is Made

By A. G. Ingalls

GELATINE, that exquisite confection that melts away in the mouth into cool, fragrant nothingness is assimilated by the stomach quicker and with less effort than any known food. Hospital physicians, as well as hospital patients are so well aware of this fact that it finds a large place in the diet of the sick. That those who are well love it almost goes without saying. When the appetite palls and we seem to crave nothing at all, gelatine by some magic slips down the throat and leaves a sense of fullness without a sense of qualm. In food value it is almost equal to sugar and like it it supplies heat and energy to the body without burdening the digestion with proteins. Gelatine is not only a welcome dessert but it is food.

One of the Chemical Laboratories in a Dutch Gelatine Manufactory, Where Gelatines Are Tested.

The quaint old Dutch city of Delft, noted for rare porcelains is also noted for its manufacture of gelatine. To its quays come tramp ships laden with cargoes of bones from India; while other ships carry to the United States large consignments of gelatine that has been made from these bones. More gelatine is used by the United States than all the rest of the world put together, for we are the greatest consumers of ice cream in the world and it is a fact that over 90 per cent of the commercial ice cream made in this country contains gelatine. The next time you eat ice cream remember that one of its important constituents probably came from India and was derived from animal bones.

Bones from India? Bones of what? Not old bones bought of the rag-pickers! No. Gelatine of the kind that is made in the Netherlands is made from the carefully selected shin-bones of the East Indian water buffalo. This is not the buffalo that once roamed the "Great American Desert" in seemingly inexhaustible numbers. It is not even a wild animal. In India the water buffalo takes the place of the horse. It is the principal farm animal. It is domesticated. But the Hindu does not eat water buffalo—any more than he eats beef. Buddhism forbids either the eating or the killing of all animals and it is because of this religious taboo that ninety thousand tons of sun-bleached and degreased buffalo bones are available annually for the manufacture of gelatine, as well as of bone buttons and Japanese ivory carvings.

Gelatine is found in the bones of most animals, as well as in certain of their tissues and membranes, and its easy availability derives from the fortunate fact that while insoluble in cold water, it is easily soluble in hot. When cooled, it forms a jelly which is able to include within its mass from five to ten times its own weight in water.

In a chemical sense, ignoring the high'y important considerations of freedom from harmful bacteria and certain chemicals introduced in manufacture, common glue is not greatly different from gelatine. However, little pains need be taken to insure that glue should be germ-free. Its essential quality is its stickiness. As long as it is sufficiently sticky it makes little difference what part of the animal, nor for that matter, what animal, it comes from. Glue is often decidedly offensive to the nostrils because there is no particular need to keep out the bacteria that produce decay. Almost any pure food will decay—unless steps are taken to prevent it. But instead of saying that gelatine is a sort of glorified glue, let us say that glue is often a debased and unclean gelatine. Many of the manufacturers of gelatine also make glue, generally in separate factories or in separated parts of the same general factory group. By their knowledge and equipment they are better able to make it than others, but they are decidedly careful about keeping these two branches of manufacture unscrambled. Otherwise the pure food laws would reach out for them in short order. Gelatine imported from the Netherlands is made from clean raw material and the processes take place in as clean an environment as only the scrupulously, insistently clean Dutch people know how to maintain. The old joke about the Dutch housewives getting down on their knees and scrubbing the very sidewalks is based on fact—they do it. It is difficult to see how the husbands of these everscouring, irrespressibly energetic Dutch women can derive any solid comfort or repose from their home life.

The full process of making gelatine requires from four to six weeks of continuous day and night work. First, the sun-bleached, degreased bones are treated in a vat for several days in a weak solution of muriatic acid. Gradually the mineral matter in them, such as calcium or lime phosphate, and the carbonates of calcium and magnesium are dissolved out, leaving behind the material which contains the gelatine in its unfinished condition. An experiment which is analogous to this process may be tried out by any one by placing a bone from the table in a weak solution of hydrochloric acid and leaving it several days. The instructive part of the experiment consists in the discovery, made after the solid matter is gone and a soft glutinous core is left, that bone contains so much within itself that is not bone. As much as 60 per cent of the volume of some bones consists of gelatine.

The residue that remains in the vat after the treatment with acid is next washed many times with pure filtered water. The purpose of this is to remove practically all of the chemical compounds formed when the acid unites with the minerals forming the rigid part of the bone. Just as in careful chemical work, clean, filtered water is used for this purpose.

Following this the stock is treated many times with lime water, removing any fats that may be present, and at the same time loosening the fibers and releasing the gelatine. Then the stock undergoes several washings and goes to the vat for the next process, which is the boiling.

The purpose of the boiling is simply to extract the gelatine, since it is soluble in hot but not in cold water. After the first boiling most of the gelatine rises to the top, where it is drawn off. Several successive boilings at increasing temperatures (necessitating that the liquid be contained in a tight boiler in order that higher temperatures may be arrived at) free practically all of the gelatine. Of course, the strongest gelatine comes off with the first boiling, just as by far the most of the coffee is extracted from the coffee grounds with the first water.

The gelatine which has been drawn off is now run through pipelines into a specially cooled room where the thin, hot liquid soon cools into a jelly-like mass. It is then cut up into sheets and placed on the nets over wooden frames which are conveyed to a long alley through which a strong current of hot, dry air is blown. The purpose of this is to remove the moisture in the sheets, and the greater part of it is removed there. This puts them in condition to be ground up, ready to be packed in the common granulated form for use. The long process of manufacture is now completed.

But before it is put out on the market the gelatine must be tested and graded. Each run is tested independently by several chemists, and these tests are of two general kinds. One has in view the determination of the number of bacteria, if any, present; the other, the percentage of unessential chemicals contained. In both these regards the gelatine must conform to the rigid requirements of the pure food laws of the United States, as well as the often more rigid requirements of individual states such as, for instance, Pennsylvania and North Dakota. It is claimed that the gelatine imported from the Netherlands is higher in purity than the requirements of the American pure food laws demand.

Gelatine is without doubt known by most of us as a dessert. But there are other outlets for it that are still more important. Most of it is used in the manufacture of ice cream in the United States than for any other purpose, this immense industry accounting for 8,000,000 pounds of gelatine annually. This amounts to about double the quantity consumed as a table jelly. The American candy industry uses another three million pounds every year.

In addition to these uses, gelatine is found in a large and varied list of commercial products. A few of these are pharmaceutical products such as capsules and coated pills prescribed by the physician. Not a photograph could be taken, not a motion picture shown without gelatine, although the gelatines used to coat the photographic films need not be as pure as those which regale us after a hearty dinner. The standard set by the federal food laws for food gelatines permits, out of one million parts (not one thousand) only 30 parts of copper; 100 of zinc; 20 of lead; 350 of sulfur dioxide; and 1.4 of arsenious oxide, or less than one part in 700,000 of the last named. But many table gelatines are now made so carefully that they contain only one-fiftieth of these mineral allowances. Thus they are fifty times as pure as Uncle Sam requires them to be.

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EARL R. ALLURED, Editor and Publisher. M. BENNET KOVNAT, Vice President.

Circulation Manager
PRUDENCE M. WALKER

New York Office, Suite 627, 44 Whitehall Street
R. W. YOUNIE, Manager

TECHNICAL DEPARTMENT:

DR. A. P. BRYANT, Consulting Chemist for National Confectioners' Assn.

DR. FREDERIC W. MURPHY, Consulting Chemist.

DR. M. A. POSEN
ROBT. SCHWARZ
Schwarz Laboratories

FRED. W. AMEND, Secy., Chicago Association Confectionery Superintendents.

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POLICY

THE MANUFACTURING CONFECTIONER, being a specialized publication for manufacturing confectioners exclusively, is edited in the interest of the executives in charge of the purchasing, production and sales departments, and provides a medium for the free and frank discussion of manufacturing policies, problems, methods and materials.

The same corresponding policy applies to the advertising pages which are available only to the supply manufacturers for the advertising of products which are used by the manufacturing confectioner—machinery, raw materials and factory supplies, etc.

The Manufacturing Confectioner believes in

A Technical Confectionery Institute, with model manufacturing units, resident and extension courses for practical candy men and equipped also for research and analytical laboratory service.

Uniform Method of cost finding and accounting.

Pure Food Legislation which enforces a quality standard for confectionery.

Rigid Inspection of candy factories to enforce sanitation and working conditions necessary for the production of a pure food product. through the vigilance work of a sanitary standards committee of the National Confectioners' Association.

EDITORIAL

Page the Buyers of Confectioners' Supplies and Equipment

THE underlying purpose of industrial expositions is first to *inform* the buyer rather than advertise to him. The National Confectioners' Association's Exposition will, therefore be informative. It will present an opportunity for the buyers of confectioners' supplies and equipment to meet the executives of the confectionery supply firms—the men who control the policies of the plants which collectively are such an important factor in the development of our own industry.

The close personal contact of the buyers of our industry with the supply field in a true and sincere spirit of cooperation has a very distinct economic advantage. For instance, when the candy plant superintendents and practical men meet the designing engineers and executives of the manufacturers of confectioner's machinery and equipment and discuss our manufacturing problems in a spirit of cooperation, not in a buyer-seller relationship, then the candy industry is going to have better and more efficient machinery.

There is also a distinct advantage in the buyer meeting the executives and technical men among the suppliers of raw materials. The salesmen of these firms with whom the buyer comes in contact at his desk are seldom in a position to give the buyer the important and interesting information which can be supplied by the heads of the firms who do not have an opportunity to meet the trade only on occasions like this where buyers and sellers of the industry and its allied lines can assemble together under one roof for a few days each year. This contention holds true also in regard to the manufacturers of containers and all packing and merchandising materials. An exposition affords the buyer an opportunity to meet the executives of the supply firms whom we expect to create a variety of products on which we depend to help sell and merchandise the manufactured products of our industry. Lines can be shown in greater variety and detail than is ever practicable for salesmen to carry.

There are good reasons why buyers prefer as a rule to place orders at their desks, however, an exposition has its distinct mission if no orders at all were placed. The objective of the exhibitors is not primarily to see how many orders they can book at the exposition but rather they are there to inform the buyer by having their executives in attendance and their machines or products on display for the close inspection of the buyer. It is obvious that no industry can be well organized without having a cooperative convention and exposition of this kind. The inter-dependency of business demands it. The pulse of our supply field beats right only when the candy industry is in a healthy condition and this close association of the key men of our industry with the executives of our allied industries will do more than any other one thing toward maintaining the support and constructive cooperation which all industry has a right to expect from its suppliers of equipment and materials. Remember the date—May 19-23.

Confectionery Costs

A COMPETITOR who knows his cost is a good competitor. Of all subjects on which candy manufacturers should get together in open discussion it is this one of cost finding and cost control. There are so many variables in our industry, seasons of being over-sold, undersold, and the uninsurable losses about which Mr. Lund has been discussing in this magazine the last few issues that the problem of determining confectionery costs is a more difficult one than is experienced in many other industries. This is all the more reason why the subject of costs should be on the schedule of every annual convention program in our industry.

Following the article on Cost Control which appeared in our January issue Mr. Wells has taken the comments which have been made on the article and has also interviewed a number of eastern manufacturers on this subject; a review of which is presented in this issue.

What Are Ideal Factory Conditions?

THIS is a subject for a series of articles rather than a short editorial, however, we just want to make mention of the importance of maintaining atmospheric conditions most favorable for the manufacturing processes in our industry because it is so far-reaching and has a direct bearing on a number of problems now facing our industry.

For instance, if the majority of confectionery plants were equipped with air conditioning apparatus and if our practical men understood the ABCs of moisture control and refrigeration as well as temperature control, so that air conditioning equipment would not be overloaded and rendered useless because of changes made subsequent to their installation, then the industry will have eliminated one of the obstacles and alibis of stabilized production—weather conditions.

(*Continued next issue.*)

The Drake Hotel, Chicago—N. C. A. Convention Headquarters, May 21-23.

Come to Chicago May 19-23

AMERICA'S billion-dollar candy industry will be displayed on Chicago's great Municipal Pier May 19 to 23 as it probably never has been exhibited before. It will be the first exposition controlled and managed by the National Confectioners' Association, whose convention will be held simultaneously at the Drake Hotel, which is in close proximity to the Pier.

The exposition will be replete with features of the industry, many of which have never been exhibited before. It will be a veritable "Market Place" for ideas, where every phase of the candy business will be visualized and a visit to which will be equivalent to a "post-graduate course" in candy making and all the ramifications of the trade.

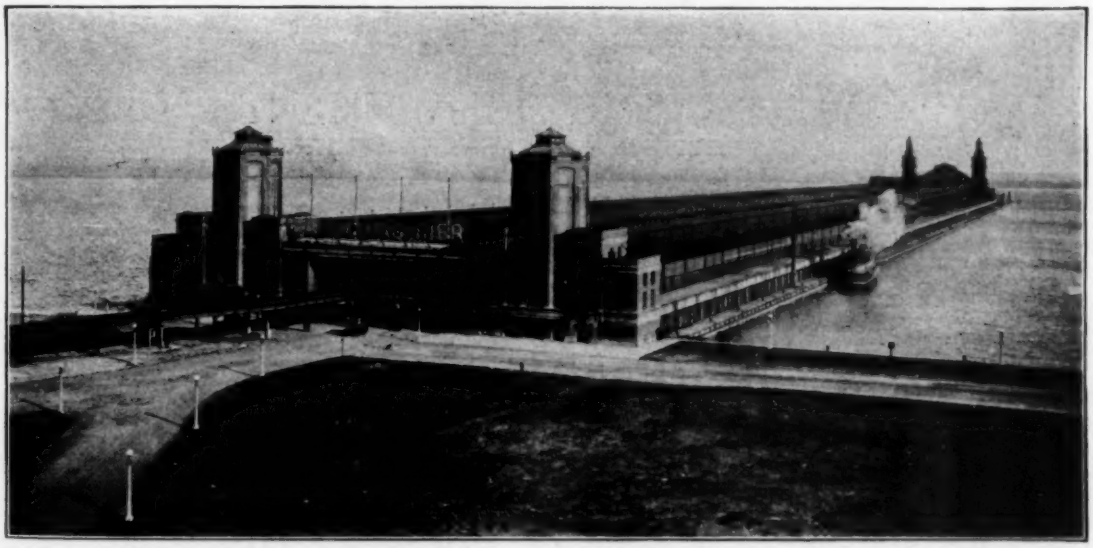
Machines that are almost human in their ingenuity will demonstrate how the candy industry has made phenomenal strides. It will be an "Exhibitors' Exposition," according to Walter C. Hughes, secretary-treasurer of the National Confectioners' Association, who predicts that it will be the biggest and most successful exposition of its kind ever held, both in point of the class of exhibits and in attendance, which will be vastly increased over former years because the hotel where the convention is in session is only a short walk from the Municipal Pier, the scene of the exposition.

Seventy-five per cent of the space has been contracted for, and the interest which the exhibitors are taking to make their displays unique, attractive and educational are further indications of its success.

How to keep candy dry and free from stickiness in jars will be illustrated in an exhibit of the Aridor Company of Chicago, which will display jars having a patented preparation in the lid of the jar which precludes the candy from becoming sticky. Candy can be kept in these jars for years, according to the manufacturers, and still be as dry as the day the jars were filled.

One of the most attractive and picturesque displays will be that of the F. J. Schleicher Paper Box Company. They are manufacturers of fancy candy boxes, but they also are artists when it comes to arranging attractive booth exhibits. The picture of the "Buried Treasure," which extends practically from one end of the booth to the other, is a work of art. In harmony with this setting, the display of fancy boxes of all types will be arranged in fantastic fashion.

"New ideas are what we want in the candy business, as well as in other business enterprices, and an exposition of this character is the place to get ideas. Members of our industry cannot afford to miss this opportunity," said Mr. Hughes. "Just one idea gained would be worth the visit to the exposition. This is the first one managed, controlled and operated by the National Confectioners' Association, and with the support given it by the active and associate members a large attendance is assured, which will afford the exhibitors a more favorable opportunity to meet their customers



The Municipal Pier, Chicago, Home of the N. C. A. Exposition, May 19-23, 1924
A Short Walk from the Drake Hotel.

than ever before. It will be conducted not for profit, but for the good of all. Any balance will be used for the benefit of future expositions.

"The forenoon sessions of the convention will be held in the Drake Hotel, but they will be adjourned at 1 o'clock and the afternoon sessions will be on the Municipal Pier, only a short walk from the hotel. The afternoon meetings will end about 4 o'clock, which will afford ample time to see the entire exposition. This being the first exhibition held under the auspices of the association, it is our aim to make it different and better than its predecessors.

"One of the features of the exposition will be the Salon, at the east end of the exhibits. This will be comfortably fitted up and attractively decorated to provide lounging room for exhibitors, their customers and friends. A competent stenographer will be at their service, free of charge. The atmosphere of 'service' will pervade the whole exposition.

"Invitation tickets will be furnished exhibitors for their customers and friends who may be interested in visiting the exposition. At the sessions of the convention prominent men of the industry will talk on practical subjects of general interest, such as cost accounting, trade marks, and manufacturing processes. The free exchange of ideas will be of great value and bring about closer co-operation and a better understanding."

The following exhibitors have reserved exhibit space as of April 10th:

PARTIAL LIST OF EXHIBITORS

National Aniline & Chemical Co., New York, N. Y.
Milwaukee Paper Box Co., Milwaukee, Wis.
Harold A. Sinclair, New York, N. Y.
Emil J. Brach Conf. Mchy. Co., Chicago, Ill.
Henry H. Ottens Mfg. Co., Inc., Philadelphia, Pa.
Ferguson & Haas, Inc., New York, N. Y.
Stadler Photographing Co., Chicago, Ill.
Bendix Paper Co., New York, N. Y.
H. Kohnstamm & Co., New York, N. Y.
Anheuser-Busch, Inc., St. Louis, Mo.
B. H. Bunn Co., Chicago, Ill.
H. Schultz & Co., Chicago, Ill.
Horine & Bowey Co., Chicago, Ill.
National Equipment Co., Springfield, Mass.
The Nulomoline Co., New York, N. Y.
Thos. Mills & Bro., Philadelphia, Pa.
Vacuum Candy Machinery Co., Chicago, Ill.
Thomas W. Dunn Co., New York, N. Y.
Foote & Jenks, Jackson, Mich.
F. J. Schleicher Paper Box Co., St. Louis, Mo.
Clinton Corn Syrup Refining Co., Clinton, Iowa.
National Bundle Tyer Co., Blissfield, Mich.
Franklin Sugar Refining Co., Philadelphia, Pa.
Read Machinery Co., Inc., York, Pa.
J. G. Cherry Co., Cedar Rapids, Iowa.
White-Stokes Co., Chicago, Ill.
Kay-White Products, Inc., New York, N. Y.
Du Pont Cellophane Co., Inc., Buffalo, N. Y.
Vorhees Rubber Mfg. Co., Jersey City, N. J.
Wm. J. Stange Co., Chicago, Ill.
Atlantic Gelatine Co., Woburn, Mass.
Kalamazoo Paper Box Co., Kalamazoo, Mich.
Blanke-Baer Ext. & Preserv. Co., St. Louis, Mo.
Mid-West Box Co., Chicago, Ill.
Ira L. Henry Co., Watertown, Wis.
The Aridor Co., Chicago, Ill.
The W. K. Jahn Co., Chicago, Ill.
Betts Products Co., Inc., Chicago, Ill.
Crescent Mfg. Co., ,New York, N. Y.
United States Foil Co., Louisville, Ky.
John Strange Pail Co., Menasha, Wis.
Savage Brothers Co., Chicago, Ill.
A. E. Staley Mfg. Co., Decatur, Ill.
The Bastian-Blessing Co., Chicago, Ill.
The Best Foods, Inc., New York, N. Y.

Desk Tests for Shelled Nuts

The first of a short series of articles on "Fifty Desk Tests for Raw Materials."

by A. Adams Lund

A GREAT deal has been said in previous articles about the use of a chemical laboratory in selecting raw material. The importance of methodical, scientific testing can hardly be denied. Yet, where a regularly outfitted laboratory is not available, there is need for a preliminary analysis on the part of the person who selects or passes upon the quality of the material. The practical tests enumerated in this series are designed to take care of just such situations or they may be employed where the buyer or factory manager is obliged to make snap judgment upon a lot of material offered for prompt acceptance at a sacrifice. Doubtless many of these tests will be familiar but if only one or two of them are new to you, the purpose of this article will have been fulfilled.

Comparisons Eliminate Guesswork

The greatest aid to determining the quality of a raw material is a comparison with a sample of known grading. If you have ever watched an expert coffee or tea taster, a tester in any line, in fact, you have noticed that all samples were tried in groups and seldom singly, and that frequent comparisons were made with type or standard gradings. Or to take an instance which comes nearer to our own line of business, the grading of edible gelatine. Until recently, and to a great extent even at the present time, the gelatine manufacturers matched and graded their product according to old Peter Cooper's glue standards, which, unsatisfactory and archaic though they were, for years furnished the only known language of jelly strength comparison.

Although the usual physical tests of raw materials depend for their accuracy or interpretation upon the tester's senses of taste, smell, sight and touch, we do not need abnormally developed faculties to be able to distinguish the grosser inequalities of grading. Or, having eliminated the goats, there is always the court of last resort, the chemical laboratory.

The Sample Habit

Acquire the sample habit, not by hoarding samples collected at random, but by drawing from time to time, fresh samples of lots in current consumption, which are of known quality and acceptability.

If the tests are to be of any value to you, they must be thorough. It seemed like over-doing the "analysis stuff" when a chain of candy and soda-lunch stores commenced analyzing their own sandwiches. Yet, actually they have found that the methodical pulling apart of these sandwiches has repaid them many times over in the resulting improvement in quality and uniformity. This same sort of physical analysis comprises a certain measure of the testing done by all chemical laboratories. With the exception of the Schonbein test on almonds, all the tests which the Department of Agriculture performs with imported nut-meats are of a purely physical character. Why, then, have a chemical laboratory to do this work?

The Significance of a Laboratory Test

The resort to a laboratory gives scientific significance and reliability to otherwise lay tests. It chooses representative samples, employs only those tests which are of an official or accepted character, performs each step in the anlysis completely and systematically, and interprets them in such a manner as to make them adaptable to our needs. When a buyer or superintendent undertakes to test these materials without technical supervision, it behooves him to pay strict attention to method and detail.

Various tests employed in connection with nut-meats will be taken up and discussed in the following order:

(a) Grading and general selection,
(b) Flavor (including the Bitters test on almonds),
(c) Color,
(d) Curing,
(e) Soundness,
(f) Age or crop year.

The "How" of Sampling

All samples must be *average* samples. In drawing samples from a bag or case, never take the samples from the top alone. If possible, open the cases at the bottom; and in any event, plunge the hand down in to get the sample from

as near the center as you can. When this is not convenient, average up a sample from different sections of the package. The practice of "topping off" with fancier grades is not at all uncommon.

From 10 to 30 per cent of the delivery should be sampled, according to the size of the shipment. Of a ten-case parcel, it is well to open at least three or four packages; of a twenty-case shipment, four or five packages; while on a fifty-case lot, seven or eight cases should be sufficient.

Grading and General Selection

For purposes of market pricing, given varieties of nutmeats are assumed to have common characteristics of soundness, color, flavor, etc., barring, of course, such wide discrepancies as a year's difference in crop, excessive dark meats, or entire lack of soundness. Bordeaux walnuts, for instance, may be 45c lb. irrespective of whether their color is light or medium amber; or, you may be offered at $1.10 lb., several different lots of pistachios which range in color all the way from a sickly yellow green to the highly-desirable deep green shade of the top quality meat.

Apart from the disparities which exist between the different varieties of each nut, market prices are not based upon the "aesthetic" considerations which make or mar the quality of our product, but rather upon the size, uniformity of grading and the care which is used in their selection. The wholesale movement of small Bordeaux's to the Chaberte district of France, to be packed and shipped to this country as Chabertes, is only one of many instances of the advantages taken of this method of grading.

Following are several grading tests which have worked out satisfactorily in practice:

Count and Size

1. To Determine Count per Ounce—Count Method:

Count out 100 whole kernels from the sample to be tested, next weigh and average as follows:

Sample A—100 kernels	103	grams
Sample B—100 kernels	106	grams
	2)109	grams
Average weight of 100 kernels.....	104.5	grams

Divide average weight thus obtained into 2835:*

104.5)2835.(27. — the count per oz.

*Fixed dividend obtained by multiplying by 100, the number of grams equivalent to 1 oz.

The above is the most accurate test which can be employed to determine count. The conventional and likewise simpler method follows:

2. To Determine Count per Ounce—Weight Method:

(For metric scale readings)

Weigh out 100 grams of the meats and count the number of kernels required to balance. For instance—

100 grams, 97 kernels

Divide this figure by 3.53:*

3.53)97.(27.+ — the count per oz.

*Fixed divisor representing the number of ounces equivalent to 100 grams.

(For avoirdupois scale readings)

Weigh out 4 ounces and count the number of kernels required to balance. Average to obtain count per oz.

This weight method is the simpler and the one familiar to most of you. But for the reason that the last nut dropped on the scale will not balance exactly, it is not entirely accurate. So although this method is adequate if you merely wish to satisfy yourself as to the count, the "Count Method" should be used in case of disagreement with the shipper.

A discrepancy of a couple of kernels in the count of a high-class almond may affect the value of that almond from 2 to 5c lb. Consequently, wherever a nut is to be used for dipping, topping, panning or salting, a count test should be made. Almonds, also filberts and

To the Buyer of Raw Materials:

Do you know how, without tasting them, you can determine the percentage of bitters in almonds?

Do you know the proper way to determine count, and whether the count has been obtained by "mixing"?

Do you know what constitutes a flavor test on nutmeats?

Do you let your familiarity with the commonplace tests of nutmeats breed a contemptuous disregard of these simple but essential safeguards?

In the accompanying article Mr. Lund emphasizes the importance of these tests in checking the quality of the nutmeats you buy — Editor.

peanuts which are to be used for such purposes, should be counted to the ounce; brazils, pecans and walnuts to the pound. In the case of pecans and walnuts, since they are graded in the shell, a certain amount of latitude must be accorded the shipper to offset differences in the specific gravity of the meats, thicknesses of shell, etc.

The practice of designating size by the use of such words as "midget," "small," "medium," "regular," "large," etc., should be discouraged wherever possible. These terms mean nothing and simply offer refuge for substitutions. The count cannot be faked.

Occasionally, as with Brazil-nut pieces, where a differential is charged for pieces which are selected or of large size, it is necessary to establish the size of the delivery. Either of the following methods may be employed for this purpose:

3. To Check Size of Brazil Pieces (Where large or selected are specified):

> Weigh out 4 ozs. of the kernels to be tested; count the number of pieces and compare with type sample.

Ordinarily this test for large pieces will answer your purpose; but where your purchases of nut pieces of any kind run well up into tonnage and a selected or uniform size is desired, free of nut dust and the usual refuse, an actual screening test should be employed:

4. To Grade Nut Pieces According to Size, or Percentage of Fine or Refuse:

> Construct wire mesh screens, approximately 12 in. square, with wood or metal sides to form pan. Size of mesh will vary with individual requirements. To determine percentage of fine or "siftings," use 1/8" to 3/16". Weigh out 100 grams of the meats and shake gently on screen. Collect siftings, and weigh. The weight of siftings in grams represents the percentage of fine present in the sample.
>
> To size almond and pecan pieces, use 1/4" to 5/16" mesh; walnut and small Brazil-nut pieces, 1/4" to 3/8" mesh. Screens for large Brazil-nut pieces should be specially constructed as follows: Screens to be of aluminum or sheet zinc, punched with round holes, diameters from 5/8" to 7/8" according to size of meats desired. If 5/8", holes shall be placed approximately 15/16" on centers; 3/4"—1 1/8" on centers; 7/8"—1 15/16" on centers. These will conform in most instances with the sheller's gradings.

Where nut pieces are to be chopped up for outside work, it will be readily appreciated that the larger the pieces, the cleaner the appearance of the product.

Uniformity

For certain classes of work such as roasting, panning, etc., it is essential that the nuts be uniform in size. The foreign shipper goes to some trouble and expense to properly grade his product; which for the sake of illustration may be Jordan almonds. Because of the disproportionate demand for certain sizes, he forces the importer to take a stipulated percentage of each size, let us say 2, 3, 4, and 5 crown. Almost invariably the 3's and 5's sell out first and the importer is confronted with the problem of disposing of the remaining sizes without closing them out at a loss. Almost as invariably he chooses the only other alternative; actually *ungrades* the almonds, mixing the 2's and 4's together and selling them to some unsuspecting purchaser as graded 3 crown almonds. The effect in the pan shrieks aloud against the deception. On Valencias and Aetnas this is a common abuse, more particularly toward the end of the season; while even on high-class salting almonds you will occasionally find that some careless person has mixed in 15 to 20 per cent of a smaller size. These smaller nuts will be over-roasted before the large are three-quarters done.

Mixing can sometimes be detected by the lack of evenness or uniformity with which the different sizes have been distributed throughout the package. But the best way to tell if the size is uniform is to grade out a sample by hand:

5. To Determine Uniformity of Grading:

> Count out 100 whole kernels from the sample to be tested. Determine with your eye the average size of these kernels, and set to one side half a dozen or so of this size to guide you in grading. Now grade out into separate piles those that are distinctly larger than average and those that are smaller than the average. The number of nuts in each pile corresponds to the percentage of that size present in the sample.
>
> Line up the kernels in rows of ten with the axis of the kernels perpendicular to a ruler or straight edge; the resulting "sky-line" will quickly reveal any lack of uniformity in the size of the kernels. This test is especially recommended for long, narrow meats such as Jordan almonds.

Broken, Pieces and Imperfections

In supposedly "whole" grades of nut-meats the percentage of pieces, twins, shrivels, etc., is an important barometer of the price value of the selection:

6. To Determine Percentage of Pieces, etc., in Whole Grades:

> Weigh out 100 grams of meats taken at random from a well-mixed sample. Separate out into distinct piles, as follows:
>
> | | |
> |---|---|
> | Weight of sample ..... | 100. grams |
> | Weight of broken kernels, splits, or pieces ..... | 6.5 grams |
> | Weight of twins and shrivelled kernels ..... | 1.5 grams |
> | Weight of imperfections (such as runners in peanuts, etc.).. | 0. grams |
> | Total ..... | 8.0 grams, or 8% |

The percentages arrived at in this manner should not exceed those which have been allowed for in your specifications. Where an excess of one group or another is claimed, provision should be made for the greater proportion of husk which will be lost in blanching twins or shrivelled kernels. Under the heading "imperfections" we would include such defects as the shrivelled ends or "ears" on Jordan almonds. Confectioners have often been a long time trying to discover what caused little indentations

and irregularities at the ends of the otherwise smooth surfaces of panned almonds; overlooking the presence of perhaps 3 per cent or more of these shrivelled ears on the raw material. The ears break off in the pan leaving "gumless" ends to which the sugar will not adhere until built up from the sides. The result is this characteristic depression at the ends of the finished goods.

Flavor

Testing for flavor does not mean a hit and miss nibbling at samples, as many persons seem to think. It is of practically no value whatever unless each step is conducted in an orderly fashion and the results recorded and verified. The following will serve as a useful outline of the details to be considered in testing:

7. *To Determine Percentage of Off-flavor Meats*:

Cut in half 10 whole kernels drawn at random from a well-mixed sample of the nuts to be tested. Set both halves of each kernel on a sheet of paper and number the kernels from one to ten. Taste one-half of each kernel and record the result under the appropriate number, leaving the other halves of the kernels for subsequent verification of the flavor. Taste for

A. Natural flavor characteristic of the given variety (such as the rose flavor of the genuine Mayette walnut, etc.).

B. Natural sweetness (must not be woody or flat-tasting; strong, sour, or rancid, etc.).

C. Presence of foreign flavor (identify if possible).

1 2 3 4 5 6 7 8 9 10
sweet. sw. sw. strong. sw. sw. sw. sw. strong. sw.—20% strong

Where the percentage of off-flavor meats runs high, it is advisable to make a second test and average the results:

1 2 3 4 5 6 7 8 9 10
sweet. sw. rancid. sw. sw. sw. sw. sw. sw. sw.—10% rancid

2)30

15% strong or rancid.

If the nuts which are being tested are almonds, disregard bitters for the present, taking care to rinse the mouth thoroughly if one should be taken accidentally.

Finally, taste some of the broken kernels and pieces giving special attention to the presence or absence of foreign flavor. Record as for whole kernels.

If you have difficulty identifying a peculiarity in the flavor of certain meats, have some disinterested person taste the remaining halves of these kernels and supplement your opinion with his. Pecans which have been shipped in undercured cases have frequently been known to take on the characteristic pine flavor of the wood; peanuts have assumed the flavor of the tar paper between the walls of the local shelling plant, defying for months all attempts to trace the source. Flavors of this nature may disappear to some extent if the nuts are spread. They are apt to be most pronounced in the pieces.

Perhaps one of the buyer's most disagreeable duties is to test almonds for bitters. Nor is the taste method of testing bitters an accurate one, since all almonds taste bitter after the first real one is encountered. The Shonbein test which is here given, is as simple and "painless" as it is accurate:

8. To Determine the Percentage of Bitters in Almonds:

Prepare a fresh 10% extract of freshly powdered guaiac rosin in 95% alcohol, saturate a strip of filter paper having a texture similar to C. S. & S. No. 597 with it, and allow the paper to dry spontaneously. (If you are unable to get either the alcohol or the gum locally, a line to the editor of the Manufacturing Confectioner will bring you the address where it may be procured ready made; or look it up in The Manufacturing Confectioner's Blue Book which will be delivered to subscribers next month.)

Immediately before the test saturate a piece of the prepared paper (about 4"x6") with a solution of copper sulphate (1 part of the copper sulphate to 10,000 parts of water). Spread the saturated paper upon a glass desk top or on a glass or porcelain plate. Count out 100 almonds from the sample to be tested, cut each in two in the middle so that a smooth surface is obtained, and place one-half of each almond upon the sensitized paper in such a way that the cut surface remains in close contact with the wet paper. Allow the almonds to remain in this position a few minutes. The bitter almonds will in this time show a deep blue stain upon the paper while the sweet ones effect no change.

Occasionally a few almonds will be found that give only a faint blue color by this test and in such cases if the treated surface of the kernel be removed by paring and the remainder eaten, it will be found to have only a faint bitter taste. Such almonds cannot properly be classed as bitter. True bitter almonds impart an intense blue color to the paper at the point of contact.

In some cases blanched bitter almonds do not give the Schonbein test, apparently because the enzyme has been destroyed by the hot water treatment preliminary to the blanching process. Almonds should therefore be tested before they are blanched, or if purchased already blanched, they should be tested by taste.

The simplicity of the above test commends it for use on the buyer's desk. A few sheets of the prepared paper and a small bottle of the weak copper sulphate solution are the only equipment required. The whole experiment can be performed in less than 5 minutes. The prepared paper is sensitive to light, consequently, keep it covered or in a dark place when it is not in use.

The Schonbein test is both accurate and authoritative; it is the official method employed by the Department of Agriculture.

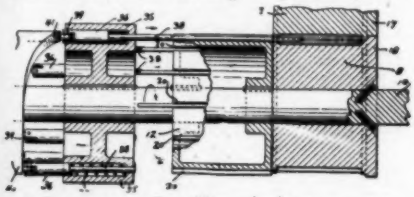
In Next Issue

(Part 2 of this article will include the following desk tests for nut-meats: Color, Curing, Soundness, Age or Crop Year, etc.)

WHAT'S NEW?

1,487,788. Candy-making machine. Carmelo C. Lombardo and Joseph Mendola, Buffalo, N. Y. Filed Mar. 16, 1923. Serial No. 625,651. 8 Claims. (Cl. 107—81.)

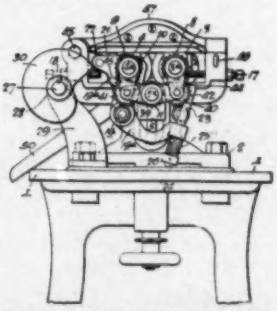
1. A candy making machine comprising a pair of co-acting mold rolls each provided with mold recesses, a stick seat roll having a plurality of



stick seats, a plurality of plungers, corresponding in number with the number of stick seats, arranged adjacent the stick seat roll, and cam means for individually operating the plungers.

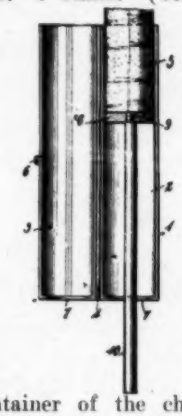
8. A candy making machine comprising a pair of co-acting mold rolls each provided with mold recesses, a stick seat roll having a plurality of stick seats, a stick feed roll having a plurality of grooves registrable with the grooves of the stick seat roll, a hopper arranged above the stick feed roll, hopper rollers arranged in the bottom opening of the hopper and engageable with the stick feed roll, a circular shield arranged around the bottom portion of the stick feed roll, a plurality of plungers, corresponding in number with the number of stick seats, and means for individually operating the plungers.

1,478,924. Candy-Forming Machine. William C. Smith, Philadelphia, Pa., assignor to Thos. Mills & Bro., Inc., Philadelphia, Pa., a Corporation of Pennsylvania. Filed Jan. 4, 1921. Serial No. 434,866. 3 Claims. (Cl. 107—10.)



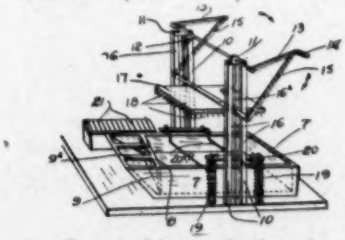
1. In a candy forming machine, the combination with a frame, of a plurality of journal-boxes adjustably mounted in the frame, rolls journaled in said boxes, means for retaining certain of said journals immovable in the frame, means for reciprocating others of said journals in the frame, and a continuous positive and direct driving connection between the rollers in said journals.

1,486,445. Confection container. Frank E. Mayol, Salt Lake City, Utah. Filed June 28, 1922. Serial No. 571,333. 1 Claim. (Cl. 206—46.)



A container of the character described comprising a pair of semi-circular side walls having inturned flanges at the lower ends thereof, means for retaining said walls in a closed position to provide a closed space adapted to receive a confection, a bottom disposed within said container and normally resting on said inturned flanges, and means connected with the bottom whereby the same may be progressively raised to eject the confection through an opening in the upper end of the container.

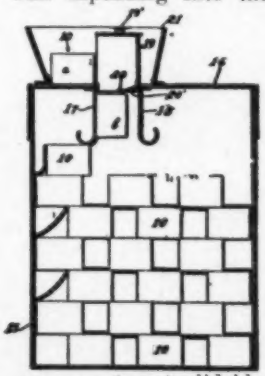
1,486,683. Machine for coating confectionery and other edible materials. John Edward Selves Plumridge and Herbert Easton, Brisbane, Queensland, Australia. Filed Dec. 2, 1921. Serial No. 519,422. 3 Claims. (Cl. 91—4.)



2. In machines of the class described, a trough containing a coating preparation, a tray adapted to carry articles to be coated, a vertical slidable plate provided with projections on its underside and adapted on its descent to force the tray into the trough containing the coating preparation, said projections being so fixed at points that they will not contact with said articles substantially as described.

1,486,562. Dispensing apparatus for confections. Charles B. Bemis, Athol, Mass. Filed Apr. 19, 1922. Serial No. 555,590. 5 Claims. (Cl. 211—8.)

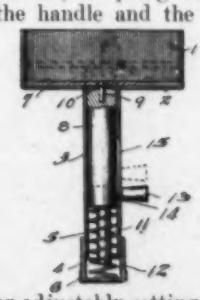
2. In combination, a chain of pockets adapted to receive ice cream bars, a container for receiving said chain of pockets, a seal through which the pockets may be passed to the outside of the container, said seal comprising a wall depending into the con-



tainer, a compartment slidable along said wall, and an upwardly swinging trap door in the bottom of said compartment, said door adapted to support one of said pockets.

1,488,138. Confection mold. James Warner, Ogden, Utah. Filed June 20, 1922. Serial No. 569,597. 1 Claim. (Cl. 107—1.)

The combination of a mold box and handle having adjustable locking means thereon, a tray in the box, a stem in the handle connected with the tray, adjustable locking means on the stem co-acting with the locking means on the handle, a spring between the end of the handle and the stem, and



means for adjustably setting the spring pressure in accordance with the predetermined one of the locking engagements in use between the stem and the handle.

Interviews with Candy Manufacturers on

Confectionery Costs

A discussion of cost finding and cost control taken from comments on the article in January issue of *The Manufacturing Confectioner.*

by Ralph G. Wells

Member Committee on Industrial and Commercial Planning, Boston Chamber of Commerce.
Member of Faculty, Boston University—College of Business Administration.
Formerly President National Association of Employment Managers.

Exclusively for The Manufacturing Confectioner

SEVERAL manufacturers have suggested that the writer amplify certain statements made in the recent article on Cost Control published in the January, 1924, issue of THE MANUFACTURING CONFECTIONER. Others have raised certain questions as to the methods suggested, expressing in some cases different viewpoints.

As a result of the general interest shown in this article, the writer has interviewed several candy manufacturers in order to secure their comments and suggestions. The result of these interviews is summarized in the following article.

One candy superintendent asked for an explanation of the methods to be used which would enable the manufacturer to know every day which departments made a profit and which departments lost money on the previous day. This question had reference to the following paragraph in the article:

> **"Unfortunately, many manufacturers do not know from day to day whether or not they are making money. They must wait for monthly or annual statements to know which way they are headed. This is one cause of financial disasters. Firms do not know until it is too late that they are losing money. Either because of lack of definite facts or because their system is too cumbersome, they have no way of knowing when or where money is being lost. Under modern simplified cost methods, the manufacturer can know every day what departments made money and what departments made or lost money on the previous day. Any cost system which fails to give this promptly should be discarded and replaced by a system that will give the desired information at once."**

Determining Which Departments Make or Lose Money on Previous Day's Work

The reply to this question was:

First, from a careful analysis of past cost records and experiences, set up a standard cost for each process. This standard to show:

(a) The amount of raw materials required to produce specified quantities of candy.
(b) The amount of labor time required to perform the operation.
(c) The machine time, and, therefore, the machine cost, if any, of performing the operation.
(d) The amount of departmental overhead to be charged to the operation on a basis of either labor or machine time.

The second step is to arrange a method whereby the actual amount of material used and the labor required to complete the work on each day's run or each lot of goods will be compared against the standard costs. There are several methods of accomplishing this. One is to mark on each manufacturing order, or batch ticket, the standard amount of material, of labor hours, and machine time allowed for. (See form A.) When the work is completed the operator or a clerk in a department writes down on the batch ticket the actual amount of material used and the time required to perform the work. Thus by setting down the actual on the same ticket where the standard allowance is written, it is possible to make an immediate comparison. Such comparison shows immediately whether the work was done within the standard cost allowance. A special note is made of any variations above or below the standard cost. These are totaled at the end of the day or the next

Form A

Material Used		Labor Hours		Machine Hours		Overhead Hours	
Standard Allowance	Actual	Standard Allowance	Actual	Standard Allowance	Actual	Standard Allowance	Actual

Form to be printed on back of each batch ticket

morning and show exactly whether the operations in the department have been kept within the standard and, therefore, whether the department has been operated at a loss or a profit.

Furthermore, this method of comparing immediately actual results with the standard allowance points out any inefficiencies in the department permitting prompt action on the part of the foreman to head off further losses. A great advantage over "post mortem" cost systems which do not indicate losses until too late to remedy.

Another advantage of indicating on each batch ticket the amount of material to be used and the time in which the work is to be performed is that it gives the man in charge of the work a gauge by which to measure his own accomplishments and to know whether or not he is living up to expectations.

Some firms have succeeded in getting their workers to look upon these standard cost figures as scores which are to be bettered if possible. Even where there is no special incentive provided, the average man enjoys bettering his own score. If a proper appreciation is shown, employes will as a general rule strive to keep within the limits set by the standard. It is largely a matter of psychology in bringing the matter to the attention of the workers in such a way that they look upon it more or less as a game in which they have a record to beat.

If the manufacturer does not wish to put this information on the work orders or batch tickets, information can be supplied to each department head showing the standard amount of material and labor time allowed for each day's work orders. The department head, or his assistant can then set down at the end of the day the actual amounts, thus giving an immediate daily comparison from which the department head can tell whether or not he is keeping his department within the limits established by the standard costs. It is a simple matter to have copies of these comparisons turned in to the cost department promptly the next morning, where they can be totaled and a summary prepared showing exactly the extent to which different departments exceeded or kept within the standard costs allowance for the work performed on the previous day. Such a summary report is shown in figure B. Some firms chart these figures to show up more clearly what each department is doing.

In order to keep track of the material used, and as a check on the use of excess quantities of material, the cost engineer of one firm recommends that material requisitions be issued with each order for the new amount of material required, and that the stores department be not allowed to give out any material except on such requisitions. This means, then, that the foreman who needs more material than the standard allowance would have to go to the superintendent or the production department and get a requisition for additional quantities.

In case the foreman should use less material than the standard calls for, this material should be returned to the store room and a credit slip issued. Under this plan it would not be necessary for the operating department to keep track of the material used on each lot, as the requisitions issued for additional material or the credit

slips made out for returned material would indicate the variation from the standard allowance.

To determine whether or not enough work has been put through to take care of the normal department overhead, it is merely necessary to indicate on each order the standard amount of departmental overhead allowed for at the end of the day; the overhead allowance for all of the orders completed can be added. By deducting this sum from the total departmental overhead for the day, it is easy to determine whether or not all of this has been absorbed by the orders put through.

If there is any deficit, such deficit must be charged to profit or loss or some other adjusting account. Where such a deficit results from the lack of orders, due to poor business conditions, or poor salesmanship, the deficit should not be included in current production costs. It should be charged to general business expense or to profit and loss, as it is unfair to penalize any order or any production department by charging it with idle machinery costs or overhead losses resulting from business beyond its control. On the other hand, if the overhead deficit is due to faults within the production department, such as poor planning, soldiering of workers, break down of machines, the deficit should be charged against the department itself.

A Practical Difficulty

Another point raised is that in many departments it is difficult to apportion accurately the time which hour workers put in on different jobs. As an illustration, in some departments a candy maker may work on several lots simultaneously, making it impossible to determine the exact time put in on each batch. This necessitates a different method. The labor time expended on the department's output for the day should be figured and compared with the total standard labor allowance for the work which has been done.

Cannot Apply Identical Methods to All Departments

The exact methods used in different departments for figuring costs or distributing overhead must necessarily vary. The general principles may remain the same, but there are many different ways of applying them. Some manufacturers seem to think that the same cost methods must be used throughout the plant, regardless of different conditions. They fail to realize that it is a mistake to try to figure all costs in all production centers by identical methods, as many departments and production centers require highly different treatment. It may even pay to use quite different systems in different parts of the plant.

Both cost men and manufacturers have had a tendency in the past to apply inflexible or cut-and-dried, ready-made systems to dissimilar production conditions. One reason why some cost systems have failed to work or have proved too cumbersome or inflexible is because those installing them did not appreciate that the cost methods used should conform to production conditions, instead of trying to make over the manufacturing methods to suit the peculiarities of their favorite method of cost accounting.

This does not mean that uniform cost accounting methods cannot be adopted by the entire candy industry. It merely indicates that the cost collecting methods used in the cream or hard candy room of one plant may differ from those found practical for wrapping or packing departments of the same plant.

Another point was that the method suggested involved considerable clerical work on the part of employes or the foreman. The answer to this is that any method of collecting costs requires a certain amount of paper work. Someone must write down the necessary facts. Furthermore, a new method always seems at first to involve more work than the one with which we are familiar. Our habits of mind lead us to accept as a matter of course those things which we are used to and to magnify the difficulties of any new method even though the old is more cumbersome than the new.

In actual practice the methods suggested require less clerical work than the majority of accurate cost systems. At the end of each lot the worker, or a supervisor, writes down two or three figures on his batch ticket. The total time required to do this is not over thirty seconds, and unless the runs are very small would not take more than five or ten minutes during the entire day.

The greater saving, however, comes in the fact that it is much easier in the cost department to set down standard figures already computed, instead of stopping each time to translate into dollars and cents the labor time and material used for each operation separately. In the computing of standard costs it is only necessary to make a new set of figures when any variation from standard allowance is shown, thus saving a great deal of time and avoiding many opportunities for inaccuracy.

Starch Room Costs

The foregoing statement should also answer the objection raised that in such places as the starch room, where there are a number of operations, it would take all the time of a clerk to record the labor expended on each lot of goods going through the room.

It is further suggested that the problem of computing labor costs in the starch room can be simplified by absorbing the labor costs into the machine costs. For this purpose there should be set up in the starch room four cost elements:

(a) Machine hours for moguls, depositors, or other equipment.
(b) Cost of dropping nuts or fruits.
(c) Handling cost.
(d) Storage cost.

Analysis of Cost Variations by Departments. Date_____

Dept.	Order No.	Kind of Work	Standard Material Allowance	Actual Variation		Standard Labor Allowance	Actual Variation		Standard Machine Allowance	Actual Variation		Standard Overhead Hours
				+	−		+	−		+	−	

Form B

The mogul or machine hour cost is to be charged against each lot in accordance with the time required to run the batch through the mogul. For the sake of convenience, the cost per hour of the labor required to operate the mogul is included in the machine hour rate, so that it is not necessary to figure labor costs separately for this operation. This method is frequently used to an advantage in other types of machines, where the labor time is identical with the machine time.

As nut dropping is a separate operation not applied to all pieces, it should be figured separately. If this work is paid for by the hour, instead of by piece rate, the labor to be charged to each lot can be figured easily by setting down on the order ticket the length of time that each crew works on a different lot.

Handling charges should be figured at so much per tray, the standard cost to be arrived at by dividing the total number of trays normally handled into the cost of the labor required for handling this quantity. Where a smaller run than the normal is put through with the same crew, it is then necessary to subtract the standard handling allowance from the actual amount of labor involved, the resulting difference representing a loss due either to lack of business or to poor management in planning runs, so that the maximum output will be secured from the department.

The storage charge may be computed on the basis of the amount of space occupied in the storage. It costs just as much per day to store a tray full of marshmallows as one of heavy cream centers or gums. The charge should be either on a daily or hourly basis, because some goods are kept in storage longer than others. Marshmallows cost more per pound to store than some other kinds of candy, first, because the same number of pounds takes up more trays than cream centers, and the trays stay in the storage room much longer than the others. In checking the actual storage charge against the standard allowance, the same practice would be followed as recommended in the case of handling.

Where to Charge Excess Overhead

It has taken some time for manufacturers to realize that excess labor, idle equipment, or storage space and surplus overhead should not be charged against current production, but must be carried as a separate item and charged either to general expense, profit and loss, or distributed over production made during busy seasons. This latter method would be more equitable, as surplus factory capacity is really maintained in order that the extra business may be handled during rush periods. We should know just how much it costs us to maintain this excess capacity eight or nine months out of the year, for the sake of the larger production secured during the remaining three or four months. It might easily happen that the high cost of maintaining a portion of the plant in idleness for two-thirds of the year might be greater than the net profit derived on the work put through during rush periods.

Some firms have worked out their costs so accurately that they have different sets of standards for use during different seasons, as it has been their experience that their prime costs are lower at different periods of the year,

depending upon the pressure under which the organization is working.

One advantage of charging to a separate account all loss through idleness of employes or equipment, or through the slowing up of workers during slack periods, is that this separate account then shows clearly just how much is being lost through lack of business. When this expense is known, a firm will frequently find that it can afford to make concessions on certain lines in order to get business which will keep the plant running on more even basis.

Comparing Departmental Costs

An interesting point not mentioned in the previous article was brought out by one manufacturer. He has been seeking a fair basis for comparing departmental costs from day to day, and, to illustrate his point, cited a case where a department head had been criticized because his overhead costs were all out of proportion to the number of pounds produced by the department during the past week, whereas the previous week he had made a more favorable showing. The foreman's answer was that his pound costs were high because he had been running almost exclusively on marshmallows and other light goods, so that the total bulk of candy produced was equal, if not greater than, the previous week's work. Nevertheless, because of the difference of the specific gravity of the material used, the poundage of the large quantity was less than the poundage of the smaller quantity. This firm is, therefore, endeavoring to establish a fair ratio of comparison between different classes of goods. In order to do this such goods as peppermint creams are given a weight value of one, centers containing nuts or fruit have a ratio value of one and a half, and marshmallow or two-layer centers have a value of two. Under this plan the daily or weekly output of a department could be reduced to a fair and equitable figure for comparison with previous runs.

Another question regarding the article related to an apparent inconsistency between the statement on page 27:

> **"The second essential is that cost data and figures should be available immediately after work has been completed."**

and the statement on the next page, under the fifth essential:

> **"That the system must be comprehensive and continuous, and take into consideration all the eventualities and all factors. While this does not mean that the actual cost must be kept for every batch of candy, it does mean that the cost accounting system must be in actual operation throughout the year, so that every item of expense will be included."**

The question raised was as to whether a cost system which takes into consideration all eventualities could be available immediately after the work is completed, as many things may happen later on which will greatly increase the cost of the lot. This is an important point, as the exact cost of a particular lot of goods is never known until it has left the factory, and even then there is a possibilitity that the goods may not prove satisfactory and be returned by the customer. The total cost of a lot, however, is quite different from the daily costs, which are accumulated in each department. The point which the statement quoted intended to develop was that we should know each day how much material and labor expense has been expended in a department to produce the work that is being put through. This daily cost is needed as a basis for control of expenses and is not necessarily the same thing as the final cost figures which can only be made up after the entire lot has been completed.

The other point which his question raised as to the meaning of the statement that it was not necessary to keep actual costs for every batch is answered by the explanation given earlier in the article regarding method of handling cost in a room where the cost is figured on the basis of the total day's work rather than by individual items.

Distributing Purchasing and Stores Overhead

One manufacturer raised the question as to how overhead, due to the operation of a purchasing department and a raw material stores department, should be distributed; should these items be lumped into general overhead or was it more accurate to distribute them over material costs? In this case it was suggested that the total cost of operating the raw material stores should be distributed over the material bought by setting up a storage charge, figured on the amount of cubic space occupied per day or week, and varying as to whether the goods were kept in cold storage or in general storage.

The expense of operating the purchasing department should be distributed over the material bought on the basis of value, as it has been found that the purchasing agent actually spends more time in buying fruits, nuts, butter, and other expensive items than in purchasing the lower-priced but bulkier materials which are used in large quantities. It was also decided that there would be added to each invoice received a small charge of a few cents to cover the cost of handling and checking the invoice, and another charge to cover the cost of inspecting and checking the shipment. Under this plan the material costs would include the following items:

(a) Purchase price.
(b) Freight and delivery charges.
(c) Inspection cost.
(d) Clerical charge.
(e) Storage and handling charge.
(f) Share of purchasing expense.
(g) Interest on money invested.
(h) Allowance for shrinkage, waste, and cleaning.

In reducing this total material cost to a unit basis, care should be taken that the total of items (a) to (i) is divided by the number of workable pounds of material secured, rather than by the number of pounds originally received.

While discussing the question of storage costs

it might be well to mention that the carrying and storing of finished goods manufactured in advance of actual sales or in advance of shipping dates should be figured in as a manufacturing cost. As a general rule where goods are made very far in advance of delivery dates it is done for the purpose of regularizing the production schedule, to permit the maintenance of an even working force, or to keep idle plant and equipment busy.

Perhaps one of the most important points made by manufacturers interviewed was the need of checking estimated costs against actual costs.

Another manufacturer wished to re-emphasize the importance of the statement that unless the operating and overhead costs of machines was charged directly to candies passing through a machine, that hand-made candies and other goods requiring practically no machine work would bear an undue proportion of the total machine cost of the plant. He said that he knew some manufacturers who included the carrying costs of machines in their general overhead. It has been the experience of this firm that their improved cost system enables them to allot their costs more accurately over the different classes of product made and had showed up the lines that were in reality causing an unfair share of the expense.

Another man pointed out that while the suggestions regarding cost keeping were fine, the difficulty was that only those firms who had already had good cost systems would read the article, while the manufacturer who was so far behind the times as to have an antiquated cost system was of the type that never bothered to read articles which might disturb his self-satisfaction or cause him to change his mind.

Talking somewhat along the same line, another candy executive says that too many manufacturers do not include everything that they should in making their cost estimates. According to him, many omit definite items of expense in estimating the cost upon which they base their selling prices and do not realize until after orders have begun to come in that the expense is greater than originally estimated. Furthermore, they do not take into consideration items which increase the expense, such as spoiled batches, scrap, packing cases, tissue paper, twine, returned goods, and similar charges.

Another expense frequently overlooked is the use of extra material, such as throwing in extra cocoa butter to make the chocolate liquor run better or putting in more fresh butter than is called for, in order to finish up the lot in the bottom of the tub. There are many places where additional material is put in for the sake of good measure if it is handy, and while these items do not amount to much in themselves, yet in the aggregate they have considerable effect on the profit at the end of the season.

Estimating Blank for Figuring Costs

Firms are injuring themselves by the loose methods used in computing costs and fixing prices. He recommends the adoption of an estimating blank which will have on it all of the items that should be included in costs. Among these would be the following:

(1) Material cost, including freight, trucking, storage expense, overhead for purchasing.
(2) Allowance for shrinkage and loss in cleaning, manufacturing expense, including total labor, machine, and storage expense. Allowance for scrap and seconds.
(3) Cost of package and packing materials. Cost of tying, wrapping, labor packing cost, factory overhead. Expense of preparing for shipment and delivery charges.
(4) Allowance for returned goods, advertising expense, selling expense, general administrative overhead.

Undoubtedly other items will occur to manufacturers which should be included in such a list. Many of the items mentioned above may seem trivial, but the point made by this manufacturer is that therein lies the difficulty in making estimates—many items that are small in themselves, but amount to a considerable figure in the aggregate are dismissed by some makers in figuring costs, with the assumption that the item is not worth figuring.

As a further check on the accuracy of estimates, this executive suggests that all estimates upon which selling prices are based should be preserved until sufficient quantities of the candy have been made to provide actual cost figures, so that the estimator may find out how nearly correct his guesses have been.

This entire subject of cost control is of such vital importance, not only to the individual manufacturer but also to the entire industry, that it is to be hoped that at the Annual Convention in Chicago next month, when Cost Accounting is discussed, steps will be taken to secure more uniform practice on the part of candy manufacturers in their cost methods. Steps should also be taken to conduct a campaign of education among those manufacturers who think that their business is too small to warrant an accurate cost system. It would be a great help to such men if someone could show them wherein they are losing money and why it is that at the end of the year their profits are not as much as they should be. Such action would not only aid the manufacturer who did not know his costs, but would have the effect of reducing the present tendency on the part of some manufacturers to sell goods at a loss to themselves and an injustice to other firms.

The Manufacture of Marshmallow

The third article in an extensive series on technical and practical subjects pertaining to the production of confectionery.

by George J. Shaler

MARSHMALLOWS—the most abused and calumniated of confections. Tough, gummy, hard, tender, white, yellow or straw color and each with its advocates. When right, they are as delicate to make and handle as they are to eat; as sensitive to heat, cold and humidity as a tropical plant. Consider how they were introduced to the public.

In the Early Days

Many years ago when it was more difficult to buy candy the druggist was called on to supply sweets to his trade. He carried certain medicated products which served to satisfy the sweet tooth. Among these were rock candy, lozenges, stick licorice, colt's foot rock and marshmallow paste. This paste was prepared by beating together a mixture of powdered sugar, gum arabic, powdered marshmallow root and egg whites. It was spread in trays, marked off in squares and allowed to dry. As a cure for coughs and huskiness it had its adherents, but was most popular as a confection, particularly when fresh and short on medication. From this start came the marshmallow of today.

Different Types of Marshmallow

Commercial marshmallow falls under two heads: cut and cast. The latter is the principal sufferer from ignorance and competition. The first is a little too spirited and resents abuse so violently as to make it a dangerous plaything for the inexperienced.

Cast marshmallow is of two types: Gum arabic or old-fashioned and gelatine or moonshine. There is no longer any sharp line of demarcation drawn between the two as the formulas for each have been combined to secure the best points of each. Whether it is to be cooked or beaten raw is dependent on the beater. With proper equipment the same results may be obtained in either way unless the formula calls for the incorporation of cooking starch, which is sometimes resorted to to secure body and shortness.

The heavy bodied gum arabic marshmallow of other days still has its supporters, but more of the light, fluffy, gelatine drops are sold in a day than the makers of the legitimate drop can dispose of in a season. This article will be confined to the field of greatest activity—the gelatine marshmallow.

Qualifications of a Good Marshmallow

All facts and figures which follow are subject to modification to suit local conditions, but are correct in relation to one another. When marshmallows are referred to, the plain white drops are meant (50 to 53 to the pound). All figures on drying and setting being based as above must be modified to meet varying proportions of surface area to volume as drying and cooling must always be figured in relation to the exposed area of the piece. If white drops can be manufactured successfully other types will prove very simple.

In a full discussion of any kind of manufacture, the process through which the raw material must pass should first be given in detail. Without an intimate knowledge of this and its dangers it would be hopeless to try to prepare a formula. The process being fixed, the formula should be so drawn as to conform to all the conditions which the goods will meet in their journey from the beater to the consumer. This chapter will therefore be confined to the process and a discussion of formulas and materials reserved for a later issue.

In a discussion of this kind the first point to be settled is, "What constitutes a good marshmallow?"

First, it must be tender.

Second, unfortunately for its quality, it must be white.

Third, its surface must be smooth and unchecked; a complexion, not simply a skin coat.

Fourth, the drops must be uniform in size and weight.

Fifth, they must retain all these qualities for a time long enough to market the product and satisfy the consumer.

Proper Manufacturing Conditions

The ideal atmospheric condition under which to manufacture marshmallow would be one of uniform unvarying temperature and moisture content.

To manufacture the product well and economically the plant must be equipped with a good dependable standard beater running about 150 R. P. M., a printer, depositor and separate starch buck. Not less than three days' supply of moulding starch should be in the trays and a proper and perfectly uniform dry room must always be in operation for conditioning the starch.

The batch should never be set up or beaten until the operator is sure that the starch is ready.

More, probably, depends on the condition of the starch than on any other one factor in marshmallow manufacture. By properly conditioned starch is meant starch which at any

and every point in a stack of thirty boards shows from 5 to 5½ per cent of moisture, 75 to 80 degrees F. in temperature, and is white, clean and free from tailings. These conditions are essential.

Starch if too cold will set the gelatine in the drop too quickly and so prevent the even drying of the inside. Starch above 80 degrees F. on the other hand sometimes causes a discoloration of the goods, a straw or even brown tone showing on that surface against the bottom of the impression. Care and understanding are necessary in order that the starch may be properly prepared.

Assuming that the dry room shows a uniform temperature from floor to ceiling of 140 degrees F. and that the starch trays have remained in its constantly changing air for 18 or 20 hours; the starch should show an average moisture content of 4½ per cent. This moisture, however, would not be evenly distributed, as the rate of diffusion throughout each tray is less rapid than the surface evaporation. After standing in the starch room at 70 degrees F. for three or four hours a thorough distribution takes place and an additional ½ to 1 per cent of moisture is absorbed. In other words, the conditions in the starch are then uniform and according to specifications.

Five to 5½ per cent of moisture is not an arbitrary figure, but is placed as a safety point for two reasons. Above 5½ per cent the drops often show a crust on the surface which have been in contact with the mould. The drying is too slow. A uniform moisture content below 5 per cent is difficult to obtain in an ordinary dryer and to maintain afterward in the starch room. The moisture must be the same every day or the output of one day will be too soft and that of the next too tough from over drying.

The texture of marshmallow is dependent to such an extent on the water content and consequently on the condition of the starch that where an inferior dryer turns out stacks which show 5 per cent at the bottom and 2 per cent at the top, the drops from the bottom trays will be right while those at the top will be almost like leather. It goes even further than this. Personal observation has shown the writer that in one tray taken direct from the center of a stack in the dryer and used before it had time to equalize or cool, the goods in the outer rows were too dry, while those in the center were satisfactory in texture but were slightly yellow and crusty at the bottom of the impressions. This color and crust were directly traceable to the excess moisture in the center of the board. A comparatively short exposure to the air would have overcome this by allowing the moisture to redistribute itself throughout the starch.

The starch having been dried to a point below its normal moisture content, makes immediate

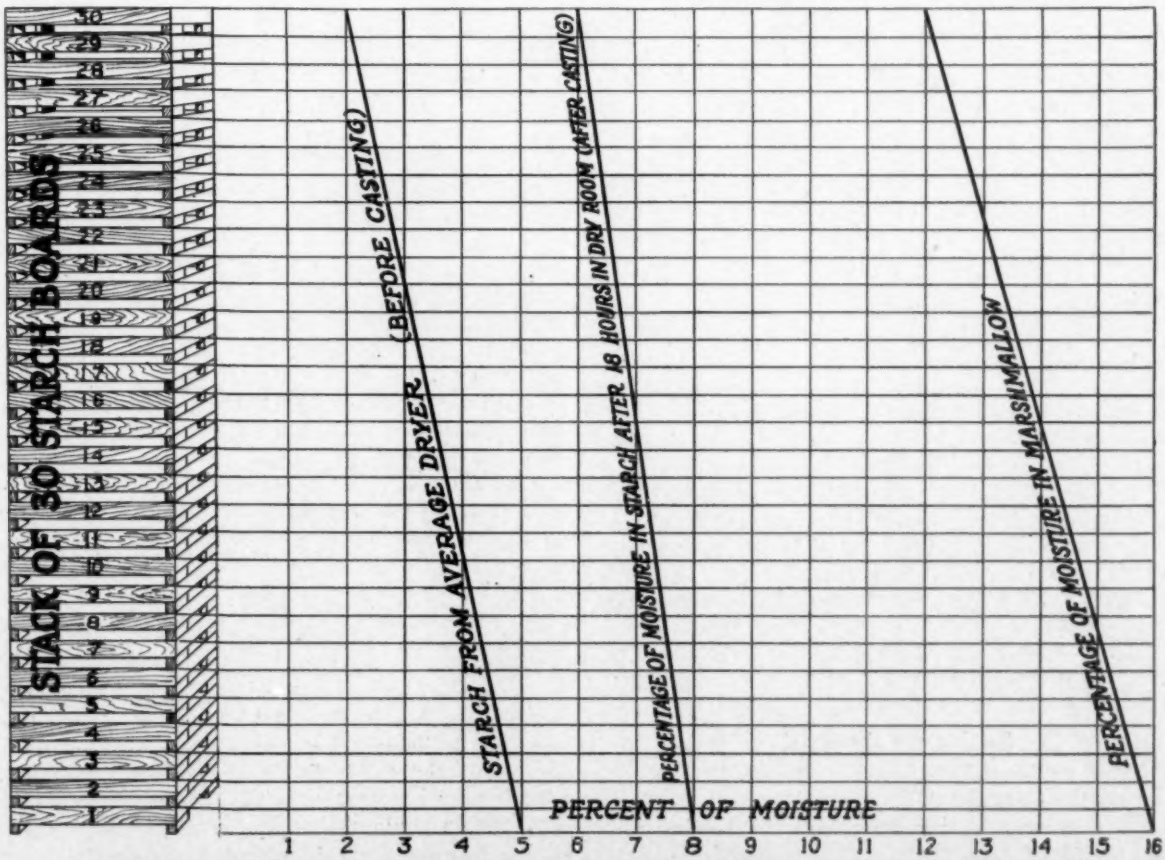


Chart showing variables in moisture content of starch in trays from bottom to top of a stack of thirty boards.

NOTE: The last curve at end of above chart was lettered in error and should read: "Percentage of Moisture in Marshmallow after goods have been shaken from Starch."

and vigorous efforts to regain the loss. The wet marshmallow is the readiest source of water and it therefore draws on that supply. This effort is so marked that if the drops are cast in starch of varying moisture, that is, in starch boards which show a higher moisture content in one part of the stack than in another, the ratio of moisture between the trays will remain almost the same during the setting of the marshmallow and the moisture in the drops will decrease in the same proportion.

The accompanying graphic chart shows the meaning of the above paragraph very clearly.

Curve No. 1 shows the varying moisture in the stack from the top tray to the bottom one, before goods were cast.

No. 2 shows increase in moisture in the same stack after the drops have been cast and allowed to lie in the starch for 18 hours.

No. 3 shows the difference in moisture remaining in the marshmallow drops after they have remained in the starch 18 hours.

These curves should be convincing proof of the need of uniform starch.

If the goods are to be white the adherent starch must be clean. Tailings adhering to the surface of the drops are unsightly. If left behind in the starch they spoil the impressions and cause a rough irregular product.

Keep Batch at Uniform Temperature

The starch is ready and the batch in the beater. Here again the importance of uniform conditions is often overlooked. The better beaters are provided with water jackets which may be heated or cooled at will. This change of temperature is seldom desirable, but the jacket has a very important use: that of maintaining an *even* temperature in the batch. It is hardly necessary to enumerate the reasons for this here. Every reader knows well the effect of a few degrees change in temperature on a gelatine solution or on corn syrup. They form a large part of the body of the product. A still more vital reason is found in the effect of beating warm air into one batch and cold into another. Too heavy a shrinkage appears on cooling the first. Too great an expansion on warming the second. A temperature sufficiently high to insure free casting must be maintained. Between 105 and 110 degrees F. is satisfactory with a room temperature of 70 degrees F. The temperature of the batch must be right regardless of the room temperature.

If an empty bottle is heated either the cork flies out or the bottle bursts. It is well to remember this when dealing with marshmallow, for each drop is a collection of very small bottles without corks but with elastic sides.

Setting Up the Batch

Nearly all goods today are expected to count out to the pound. The control of this begins at the beater and that means at the setting up of the batch. All water required should be figured at the beginning. If a great deal of water is desired and the beater is not very efficient, it is best sometimes to hold some of it out and add it when the batch first turns white. Too great a dilution of the gelatine solution makes it impossible of beating in any but the best beaters. As soon as the batch turns white begin adding the water slowly and at a temperature equal to that of the batch. All should be in the beater five minutes before the beating is finished in order to secure its complete and thorough incorporation with the other ingredients. Overdoing the bad practice of "cutting back" the batch at the last moment will result in the production of a piece which is jelly in the bottom of the mould and a very frothy marshmallow on top. It will often cause a thin skin of jelly on the top of a regular and otherwise satisfactory drop. The unincorporated water sinks through the deposited piece, taking with it in solution sufficient unbeaten gelatine and sugar to form this jelly. If this does not happen it is quite as likely that the surplus water will cause a hard crust to form on the surface of the goods regardless of how dry the moulding starch may have been.

On the whole it is always best to figure the entire amount of water required and, where at all possible, add all water at the start. This will avoid many of the evils complained of in marshmallows. When figuring this water, allowance must be made for the drying conditions on the day on which the goods are made. A heavy loss of water takes place during beating, but the exact amount necessarily depends on the relative humidity of the air surrounding the beater.

Standardizing Weight of Batch

All things being ready and the conditions made as nearly standard as possible, the time necessary to beat a batch will be known to within two or three minutes. When this time has nearly elapsed a pail should be drawn full of the batch and poured back into the top of the beater. No beater is so perfectly built that the entire contents down to that last portion which lies in the neck of the valve is evenly beaten. That in the bottom is sure to be heavier than that on the top.

A gallon measure must now be drawn exactly full and carefully weighed. If the weight of a gallon is kept the same for each batch the uniformity of the individual pieces is distinctly up to the depositing machine.

When completed and the weight found to be right the batch is drawn from the beater. For greater economy of equipment and space a tank may be provided sufficiently large to contain the entire batch. It should be insulated in such a way as to insure the contents remaining warm enough to cast. If this method is used a third batch may be started in the beater to be ready in time to replace that in the receiving tank.

Little need be said about the depositing of the batch. The machine should, of course, be

clean and at a temperature the same as that of the marshmallow paste.

When the boards are full and the exposed bottoms of the drops dusted with clean starch the stacks should be rolled away without needless jarring and lined up in such position that there is room for a free circulation of air between them. Too high a percentage of humidity is bad, but not so serious as too high a temperature. The bulk of the drying, as indicated on the chart, takes place through the moulding starch, but the goods will not set properly if too warm. A gelatine solution jellies only on cooling and it is the jellying of the gelatine content which sets the marshmallow drops. This is best accomplished at 60 to 65 degrees F. The slow cooling allows of the proper amount of drying before the gelatine is set hard and prevents the sweating which would occur were the drops to be brought cold into the ordinarily humid atmosphere of a packing room in summer.

Packing

The drops should be packed as soon as practical after they leave the starch. Careful watching and weighing shows that they lose moisture very rapidly during the first two days and that by the end of the third day they have reached a nearly constant weight. To be more exact, it is known that marshmallow drops which contain 15 per cent of water when removed from the moulding starch will lose as high as 11 per cent of their weight in three days when exposed to ordinary store or factory atmospheric conditions. From that time on their weight remains almost fixed. A large part of this loss occurs during the first few hours. Naturally the surface dries first, but as time passes the water content becomes equalized throughout the drops and they are tough and leathery.

A perfectly moisture-proof package should be provided for the packing and shipment of the drops. Tin or glass containers are ideal, but where these prove too expensive to warrant their use a cardboard box tightly wrapped in wax paper and heat sealed will be found very satisfactory.

It was long the custom of marshmallow manufacturers to pack their product in loose sugar and starch mixtures. It was a good way, as it left little or no free air in the box, but it had the disadvantage of deceiving the retailer as to the profit he made on a box and the loose starch was unpleasant to the one eating the goods, for it not only deadened the flavor but was unavoidably mussy on one's hands and clothes. Of late years this has been done away with by different means of coating the drops with a thin skin of sugar which, to all appearances, is a part of the drop. By finishing each piece in this way they may be packed so tightly together without sticking that there is no room for drying air to remain between them. It is still quite as important that the box be moisture-proof.

(Continued in next issue.)

COMING IN THIS SERIES:

How Far Should a Manufacturer Go in Making His Own Materials?

Atmospheric Conditions Most Favorable to the Manufacture of Confectionery

To encourage export, we have had prepared by one of the leading exporters, a report on the sales possibilities of American confectionery in various countries of the world, all the data having been gathered from first hand authentic sources.

These reports will be published monthly for the purpose of creating a wider interest in foreign markets for confectionery.

Specific information regarding individual products or reports on special countries in advance of regular publication may be obtained gratis upon request.—EDITOR.

A Survey of the Confectionery Market in CUBA

CUBA is the largest and most important of all the West Indies Islands. Its length is about 780 miles (1,255 km.); average width, 50 to 60 miles (80 to 96 km.); greatest width, 100 miles (161 km.); narrowest width, 35 miles (56 km.). At the point nearest the United States, Cuba is about 90 nautical miles from Key West, Fla. The island is 50 nautical miles west of Haiti and 85 miles from Jamaica.

The climate is tropical and insular, it varies materially, the tropical heat of the coast being modified by the altitude of the interior mountainous sections and plateaus, as well as by healthful sea breezes. The hotter, or rainy, season begins in the middle of May and continues until the end of October, but even during this period the mornings are bright and clear. The average annual rainfall is 52 inches; the heaviest rains occur in June and the lightest in March. In the northeastern section of the island the average rainfall is about 100 inches; in Habana the average is about 50 inches.

The Confectionery Market in Cuba

Included in the confectionery imports of Cuba is the small amount intended for the Isle of Pines. The Isle of Pines is a small island with a population of 4,550, located 60 miles from Batabano.

Before the war Cuba imported large stores of confectionery from England, Spain, France and Switzerland but recently has turned its attention to the United States as its chief source of supply.

The principal demand is for the high grade chocolates which constitutes approximately 80 to 90% of the trade in confectionery. The demand is scattered into minor classifications. Fancy package goods in fancy and attractive boxes, tied with ribbon and enclosed in wax paper constitute a great percentage of the trade. Chocolate bar goods of various sizes and weights, containing nut or fruit filled centers are second in demand. Next in demand is loose chocolate which is shipped in five-pound cartons. All cases containing chocolate are tin lined.

Hard candies and pan work are next in demand, the former are sugared. These candies are packed in five-pound and ten-pound tins and occasionally in glass jars of varying sizes. The Cuban demand is practically the same as in the United States, whatever is selling in the United States being salable in Cuba.

Duty on Confectionery

The duty on chocolates and sweetmeats of all kinds including immediate packages is 32½% ad valorem, while the rate to the United States is only 26%. According to article No. 288. This is a 20% on products from the U. S. The valuation of imported merchandise subject to ad valorem duties and the duties that are affected in any way by the valuation shall be in accordance with the actual market price or wholesale price of such merchandise, as bought and sold in usual wholesale quantities at the time of exportation to the Island of Cuba, in the principal markets of the country from which imported, and in the condition in which such merchandise is there purchased and sold for exportation to the Island of Cuba, including the value of all the cartons, boxes, crates, cases, bags, and coverings of any kind, and all other costs, charges, and expenses incident to packing the merchandise and making it ready for shipment to the Island of Cuba.

Commission on an invoice shall always be included in the cost of merchandise, with the exception of the consular fees charged by the consuls of Cuba. Incidental expenses, customhouse and statistical fees, papers and stamps, wharfage, etc., must also be included in the dutiable value as an actual part of the cost of placing the merchandise ready for shipment to Cuba.

Charges for conveyance and cartage, marking, and other necessary expenses incurred on account of the merchandise must be considered as part of the cost, and therefore must be included.

The insurance is not considered as part of the cost of the merchandise, nor is the fee for consular certification included in the costs.

Candy is sold on different terms, the terms between buyer and seller being dependent in most cases upon the former's credit. Terms vary from payment against documents to sixty and ninety days. Although a landed price is often required, goods are bought f. o. b. factory, but as there is practically no difficulty in making this kind of quotation, American manufacturers often do so.

There is practically no confectionery of any im-

portance made in Cuba. The first reason is that the climate is against their manufacture as the temperature is below 85° only in December, January and February. Another reason is that Cuba does not refine its own sugar. Practically the only candy made is of the "sugary" variety, and a cheap milk chocolate.

Some of the varieties imported are now being manufactured in limited quantities by local factories. Prominent among these is the Spanish nougat "Turrones," which is sold in large quantities, a good portion of the natives eating practically no other kind of confectionery. This candy is manufactured in small quantities and retailed quickly, as they get soft quickly.

These candies are sold best in the winter seasons.

As the demands of the Isle of Pines are very limited, this market is not given much attention although practically all of its imports come from the United States. A small amount, however, comes from Cuba. The most popular varieties are and have been, lozenges, caramels, chocolate bon bons and hard candies. The Isle of Pines may be covered by a salesman working from Cuba in conjunction with other lines.

The best means of selling in Cuba and the Isle of Pines is by means of an exclusive representative capable of supervising the sale over the entire island. This agent should be located at Havana. As the distance between New York and Havana is only four days and only a day from Mobile and New Orleans, shipments can be made promptly. For this reason it is not necessary for local stores to carry large stocks. Orders are placed in small quantities, as too large a shipment at one time could not be disposed of promptly enough to prevent waste. It is advisable to have the agent cover the trade sufficiently to solicit re-orders just as soon as the new stocks move. In certain cases, regular semi-monthly and monthly orders are placed by the Cuban importers. This trade is very friendly towards the United States and American manufacturers will find a responsive market in our neighbor island.

The value of the United States confectionery exports to Cuba for the fiscal years ending June 30th were as follows: in 1912, $65,179; 1913, $76,014; 1914, $83,206; 1915, $95,256; 1916, $175,646; 1917, $165,935.

For the calendar years 1918, 1919, 1920, 1921, the exports were respectively, $91,258, $183,156, $416,940, $204,756.

Virgin Islands of the United States

The Virgin Islands comprise a group of over 50 islands in the Caribbean Sea, 40 miles east of Porto Rico. These were formerly known as the Danish West Indies. Only three islands in the group have any importance—St. Thomas, St. Croix, and St. John, which have an aggregate area of 138 square miles and a population of about 28,000, mostly Negroes. English is used in correspondence, the money, weight and measures being the same as in use in the United States. The confectionery demands of these islands are not very considerable, but are increasing gradually. In 1912 imports amounted to $1,227; in 1913, $1,287; 1914, $1,971; 1915, $1,987; 1916, $2,292; in 1917, $4,656; in 1918 under American rule the imports increased to $10,433; in 1919 to $14,434; in 1920 to $16,491; in 1921 to $19,825. No duty is required to be paid on American goods.

No large shipments of candy are made because of its limited sale and the possibility of deterioration due to climatic influences. Instead, many small shipments are made. The demand is divided between bulk goods and fancy packages. The bulk candy is packed in five-pound cardboard boxes, wrapped both inside and outside with waxed or water proof paper. There is an occasional demand for pail goods, three or four pails being crated together. This lessens the strain in handling them and lessens possibilities of disaster. The package goods consists of small bars and fancy packages which retail from five to fifteen cents, the most popular seller being divided between the five and ten-cent bar goods. A number of high class boxes, preferably those in color and tied in ribbons prove popular with the average rich class of people. A pound box decorated with ribbon that can retail below fifty cents per pound will be quite successful with the general negro buying class.

The Confectionery Markets

Confectionery is imported from the United States, Porto Rico, Cuba, United Kingdom, France, Germany, Spain, Netherlands, Dutch West Indies, Virgin Islands, Canary Islands, etc., in large quantities and both the local products and the imported varieties find a steady demand from all classes of society.

The varieties of confectionery imported include practically all kinds of low priced goods from the penny goods up to the cheaper grades of chocolates in packages; so far the demand for better grade chocolates and bon bons is almost non-existant. There are no confectionery shops or tea rooms in the Republic, but all of the leading cafes and fancy grocery stores carry important stocks, the retail prices on account of freight, insurance duty, etc., naturally being higher than prevailing prices for same goods in the United States.

Local made and imported American confectionery is on sale in practically all the shops, the competition of the former being unimportant. Hard candy is most in demand while there is but a small demand for package goods. The sizes and flavors are the same as in the United States.

There is a good market for such goods as chocolate caramels, and nougats packed in attractive ½, 1, 2 and 5-pound boxes. Satin finished candies as well as chocolate covered fudge and almond bars are very popular; hard candies in 5, 10 and 20-ounce glass jars, the almond bars are usually wrapped in tinfoil. There is little demand for candies in pails or barrels, as candies that are liable to become crushed are not wanted.

The small 5c and 10c American bars retail at 10, 15 and 20c each, while the best grade chocolates bring $2.00 a pound. The duty on confectionery is $.07 per kilo or about 3 cents a pound.

Candies are imported by all classes of merchants and terms vary accordingly to relations between the buyer and seller. The retail prices are from 50 to 100% higher than retail prices in the United States.

Many American firms, without any intention to grant credits, have sent shipping documents with draft attached to bank, papers to be delivered when draft has been paid, but at the same time they addressed the merchandise to the local importer. It is possible for local importers to secure such merchandise without securing the shipping documents from the banks, and in order to avoid this the merchandise should be addressed to the bank.

In approaching the market, exporters can solicit orders from importers direct, either through correspondence or by sending a representative who can speak Spanish, to call upon the trade, or they can appoint an agent or given exclusive rights of sale to some New York export house. The sending of a direct representative is the best means of developing trade relations. In this manner, a greater amount of business may be attempted.

For the calendar years 1918, 1919, 1920, 1921, the imports were respectively, $48,958.00, $176,448.00, $280,856.00, $90,489.00.

What's Your Problem?

Turkish Chewing Candy

PD49—I am desirous of making Turkish chewing candy such as is known sometimes as Halva. Will you describe the process and equipment necessary?

This piece of goods is not difficult to make and the process and equipment are the same whether it is to be sold in blocks to be chopped off as required or in sheets or pans to be broken up. In fact, it could be made up in strips and sold as nickel goods to advantage as it is a popular summer seller and its principal drawback is the difficulty of eating irregular pieces neatly.

Equipment: Good steam kettle or open fire, a strong nougat beater equipped with some method of heating, either a steam jacket or gas burner. A good supply of caramel pans or shallow steel trays and a rolling pin. A sizing machine is a help, but unnecessary.

There are many formulas for this piece. Those given below are satisfactory in that they produce a marketable good eating product.

Cook 80 lbs. of corn syrup and 35 lbs. of sugar to 275 to 280 degrees Fahrenheit, then dump them into a nougat beater and beat until the first heat is out, then add 1½ lbs. of albumen previously soaked and dissolved in 1½ qts. of water. Put some heat on the beater and beat light and white. Flavor lightly with vanilla. If color is desired add it at this time.

When the beating is complete the mass will be extremely stiff and tenacious. In order to get it out of the beater the machine must be tipped forward and the paste drawn out with a hoe. Have the pans ready either lined with heavy wax paper or well rubbed with starch. Put sufficient candy in each to fill it and then roll flat with a starched rolling pin. Where starch is used the cake of halva should be taken from the pan and dusted off before it leaves the plant.

The above instructions are applicable to all formulas which may be set up to contain the proportions desired. The sugar should form not more than 45% of the batch and not less than 10%.

If the sugar content is below one-third of the batch the goods are very likely to become sticky no matter how carefully they are handled.

A better eating piece would result were 5 quarts of evaporated milk added when the batch was first poured into the beater. In this event the high cook should always be used.

This piece is always liable to grow sticky and should not be distributed in too large quantity. Its principal virtue as a summer seller lies in the fact that it is not chocolate and that if it does grow sticky it will dry out again with little fear of graining.

Chocolate Nougats

PD50—Will you kindly examine the samples of chocolate nougats and write us fully telling us why these crack, also giving us your recommendations for correcting this?

Chocolate covered nougat splits or leaks from two causes. A crack in coating of goods of this type is purely a mechanical difficulty. The center contains air in its composition and when the center is warmed to ordinary room temperature it expands and cracks its coating. The center in this case was coated when too cold, and therefore the cracks resulted when the goods warmed. Leaks are a different matter. A chocolate coated nougat will often exude drops of the center. This is due to the rearrangement of the water content in the center. The drops show at any thin spot in the coating, and, as nougats have sharp corners and edges, more particularly the cut kind, which are difficult to cover, the trouble generally occurs at these points. Greater care in dipping is the practical cure.

Maple Cakes

PD51—Can you tell us where we can get a formula for making maple cakes? The cakes we are interested in are those that are made in the form of a cup cake and weigh about 2 ounces. We know that they are made of cane sugar and maple sugar, but we do not know in what proportion they are used, or whether any other ingredients go into the manufacture. If you can advise us where we can get this information, also where we can buy the necessary forms, etc., we would be deeply grateful to you. As we manufacture maple syrups, we would like to make these cakes as a side issue.

Most of the so-called maple cakes (label imitation maple cakes) which appear on the market are made of No. 10 yellow clarified sugar and glucose. Real maple and granulated sugar may be substituted for the Y. C. sugar, but the flavor is not sufficiently better in most cases to warrant it.

The following formula and method if carefully followed will produce a good result:

90 lbs. No. 10 Y. C. sugar.
15 lbs. corn syrup.
Water to dissolve.

Cook all together to 240° F.; remove from the fire and rub on the side of the kettle to start grain. Cast in rubber moulds, allow to set, then dump out and let the moulds cool.

Y. C. sugar is a rather uncertain quantity, as the syrup in it is bound to settle to the bottom of the barrel. For this reason it will be necessary to vary the proportion of glucose as the barrel is used up. If too much C. S. U. is used the cakes will set up slowly and be tough, while if too little is added they will harden too fast for convenient handling and are likely to show white spots. The addition of a little maple flavor often adds to the eating quality of the piece.

If it is desired to use pure maple sugar it may be substituted for the Y. C. or for part of it. A good plan is to use 60 lbs. maple, 30 lbs. granulated or any other combination which meets with the combined requirements of the taste and purse.

PD 52—Will you be good enough to obtain for us an up-to-date formula for the manufacture of marshmallow paste to be put up in bulk for sale to hotels and restaurants?

The principal thing to look out for in the manufacture of this type of M. M. is the danger of fermentation. This is due to the incorporation of too much water. The following formula should work out O. K. but must be watched to assure the moisture content staying below 18 per cent by weight.

8 lbs. Sugar
9 lbs. Corn Syrup
½ gal. Water
} Cook to 230° F. then add 30 lbs. C. S. U. and place in beater.

Beat for five minutes then add ½ lb. albumin which has been dissolved in 2 pts. of water. Beat to desired consistency and put at once in sterile containers which must then be sealed tight.

It is not customary to flavor this paste for while a little vanilla would improve its eating quality it sometimes conflicts with other flavors used in the basic goods to which the topping is added.

Valuable Free Literature

The following publications—booklets, house-organs, catalogues, etc., are free for the asking, and will be sent to any of our readers upon request of the publisher, or if you check the ones you are interested in they will be forwarded from our Buyers' Directory files.
The Manufacturing Confectioner Publishing Co., 30 North La Salle St., Chicago.

Vanillas.—A treatise on the construction of concentrated vanilla flavors both pure and fortified. Foot & Jenks, Jackson, Mich.

Nature's Finest Flavors.—A discussion of the manufacture of terpeneless citrus natural fruit flavors, in concentrated form, from the harvesting of the fruit to the finished product.—Foot & Jenks, Jackson, Mich.

Merrell--Soule Powdered Milk for the Confectioner and Milk Chocolate Manufacturer.—A booklet describing the manufacture of powdered milk, tests for the buyer of powdered milk, and practical recipes for the candy maker.—Merrell-Soule Sales Corp., Syracuse, N. Y.

Valuable Information About Gelatine.—A 24-page booklet which gives much space to a discussion of gelatine in an impartial way. There are chapters on the legal regulations, pointers on purchasing, testing food value, function and uses of gelatine.—Harold A. Sinclair, 160 Broadway, New York City.

The Story of Delft.—An artistic booklet illustrating the city and folk of Delft, Holland, also how and where Delft gelatine is made.—Harold A. Sinclair, 160 Broadway, New York City.

Facts About Food Gelatine.—A 16-page booklet on gelatine and its uses written by a disinterested scientist and originally published in The New York Tribune. An interesting informative treatise on the definition, manufacture and the diversified uses of gelatine.—Milligan & Higgins Gelatine Co., 222 Front St., New York City.

The Helper.—A 20-page booklet, illustrating in actual colors, the principal lines of confectionery in which Nulomoline may be used advantageously. A short analysis of the characteristics of each kind of candy is given together with a suggestion for the solution of the principal problem in the manufacture of each class of goods illustrated.—The Nulomoline Co., 111 Wall St., New York City.

Formulas for Wholesale Trade.—A set of 36 formulas, each on a separate sheet, specially adapted to requirements of the wholesale manufacturing confectioner.—The Nulomoline Co., 111 Wall St., New York City.

Formulas for Retail Trade.—A set of 65 formulas designed for the retail candy shop.—The Nulomoline Company, 111 Wall St., New York City.

The Candy Makers' Guide.—A booklet describing Senneff-Herr's full line of candy makers' specialties and a set of formulas for using them. Senneff-Herr Co., Sterling, Ill.

Sugars for Manufacturers.—A pamphlet on the various sugars made for manufacturers with suggestions for using them, by C. W. Nordland.—Franklin Sugar Refining Co., Delaware and Wharton Sts., Philadelphia, Pa.

Refrigeration in the Candy Factory.—A booklet containing a series of five articles on refrigeration and air conditioning and their direct application to the manufacture of confectionery. These articles were written by A. W. Lissauer specially for The Candy Manufacturer and published in our issues of June to October, 1922, inclusive.—W. L. Fleisher & Co., 31 Union Square, West, New York City.

Candy News.—An 8-page leaflet with articles of interest to the trade, issued monthly by National Equipment Co., Springfield, Mass.

Ungerer's Bulletin.—A 16-page semi-technical publication containing articles of interest to users of essential oils and flavors. Issued by Ungerer & Co., 124 West 19th St., New York City.

"SX".—A breezy little 16-page pocket edition, edited by Peabody and published monthly by Essex Gelatine Co., 40 North Market St., Boston, Mass.

General Catalogue and descriptive literature on candy and chocolate machinery.—National Equipment Co., Springfield, Mass.

General Catalogue.—Confectioners' machinery and tools.—Thomas Mills & Bro., 1301-8 North Eighth St., Philadelphia, Pa.

General Catalogue.—Candy machinery, tools and utensils.—Savage Bros Co., 2638 Gladys Ave., Chicago.

Complete Candy Making Outfits for small candy factories and candy kitchens.—Savage Bros. Co., 2638 Gladys Ave., Chicago.

General Catalogue.—Air conditioning apparatus. Also list of 77 other special Sturtevant catalogues covering in detail each item in entire line.—B. F. Sturtevant Co., Hyde Park, Boston, or W. L. Fleisher Co., 31 Union Square, West, New York City.

General Catalogue.—Ideal chocolate and cocoa products, illustrated in actual colors.—Ideal Cocoa & Chocolate Co., 39 Park Place, New York City.

The History of Vanillin.—A 16-page booklet givbriefly the story of Vanillum and its virtues. It gives a survey of the history, uses and advantages.—Monsanto Chemical Works, St. Louis, Mo.

Sweetmeats—A Franklin Sugar Book of Recipes for making Candies and Bon Bons, Conserves, Cake Icings and Meringues, by Caroline B. King.—The Franklin Sugar Refining Company, Delaware and Wharton Sts., Philadelphia, Pa.

National Certified Food Colors.—This booklet illustrates in color the use of National Certified Food Colors. In addition it lists the complete line of primary shades and blends and gives suggestions for their application.—National Aniline & Chemical Co., 40 Rector St., New York City.

How Shall the Foreman Study

The fourth of a series of twelve articles on Foremanship.

by J. K. Novins

IN most manufacturing plants no systematic foreman training is given, yet it cannot be said that the foremen there do not receive some sort or form of instruction. The foreman's daily contact with other executive officers of the plant usually results in constant interchange of valuable information. The foremen meet in club rooms for social purposes; they gather to listen to lectures by other executive officers or by outside speakers of prominence. The shop paper in many cases has proven a good influence.

The management recognizes the advantages of such contact, and where foreman training courses have been instituted the social contact factor is in no wise neglected. Rather, it is encouraged, and sometimes the systematized training course serves as an effective adjunct.

Usually the foremen's club meeting is of a semi-social nature. It is attended by foremen, sub-foremen, superintendents, and by other major and minor shop executives. Perhaps the foremen bring their wives and sons. The employment manager generally arranges for a lecture by an authority on a subject of special interest to the foremen. The meeting may be held weekly or monthly. It is usually well attended.

The Factory Council

In the larger plant there is the factory council which, as a rule, meets once a week, and sometimes oftener, during the working hours, to discuss company policies. The factory council is usually composed of the general foreman, foremen and assistant foremen, superintendent, employment manager and other department heads, including the sales manager. In some plants it is a standing rule that the head of each department represented at the council be given an opportunity to act as chairman of the council. The factory council discusses policies and even makes definite recommendations to the management. By interchanging information and viewpoints, the foremen learn from the sales manager, the sales manager gets the foreman's viewpoint, and so down the line. The whole scheme is conducive to a broader understanding of the factory policies and conditions by the various executives.

The shop committee and the works council movement has also contributed its share toward a broader understanding of the executive functions of the foreman. In the governmental type of democratic management of the factory the foreman is usually a member of the Senate, or upper house, which as a rule passes on management policies discussed and proposed by the lower house, or workers' governmental body. According to a report by the National Industrial Conference Board, the works council idea was introduced in 200 plants during the war, affecting a half million workmen. In its report the Board says:

"Works council is intended as one means of satisfying the desire of the workers for a share in the adjustment of his work conditions; as a means of lessening labor difficulties, of allaying industrial unrest, of increasing production efficiency; and is an opportunity for informing employes in production, technical and economic questions."

Effective as these schemes have been, they have not met a real educational need, at least as far as the foreman is concerned. While desirable in all other respects, especially in fostering the "get together spirit," there is no definite educational aim, the foremen are not learning fundamentals, and the plan management is not availing itself of the opportunity to afford the executives a deeper understanding of the problems taken up at such meetings.

Industrial Schools

These educational advantages are not to be found in the average small plant employing only one or a half dozen foremen. How shall these men study? Well, there are the various industrial and technical schools and colleges, located in industrial centers, some of which offer special educational facilities for the foreman-student. It has been only recently that such courses were inaugurated. We can name such institutions as the Carnegie Institute of Technology at Pittsburgh, and the Lowell Institute of the Massachusetts Institute of Technology. Without minimizing the importance of these educa-

tional institutions, it must be admitted that very seldom are the foreman-courses there really adapted to the diverse needs of the foreman, and very often the instruction is largely theoretical.

It is to be expected that these very same institutions will yet make wonderful progress in this field of industrial education. The University of Pennsylvania, located in an important industrial district, recently inaugurated a course of lectures for foremen in nearby industrial plants. Meetings were held in the auditorium of a city high school. Some 500 foremen, representing a variety of plants and industries, attended. They listened to a lecture. The class then broke up into small groups, each group composed of men having common executive interests. The groups adjourned to separate rooms in the building. They discussed the lecture and cleared up some of the mooted points introduced by the speaker of the evening. The men were prepared with facts, figures and individual experiences, for a week previous to the meeting the foremen had been supplied with mimeographed outlines of the subject to be discussed.

On the whole, these educational institutions have been chiefly successful in training prospective foremen, and the minor executives for the local manufacturing plants. In this way they are performing a definite service to industry.

Correspondence Courses

Another medium for the instruction of foremen is the correspondence school. This institution offers a wide range of subjects, the foreman-student picking those that interest him most. The chief disadvantage of the correspondence school is that the foreman does not enjoy contact with the instructor. This deficiency has been overcome somehow by the practice of some correspondence schools which send trained instructors to the plant at stated intervals to meet the student in person and advise him on his individual problems. Many plant managements actually encourage the foremen to pursue a course of study with a correspondence school, defraying half, and even the whole of the tuition fee.

Another development is the standardized course of study introduced in the plant by an outside educational institution specializing in foreman-training. One such institution claims that it has trained 37,000 foremen. The basis of the course is the organization of a study club, or group-unit. Though the outside educational institution assists in the organization of the study-group, the administration is in the hands of the foremen-students. As a rule one of the company executives undertakes the chairmanship of the group. He is guided by definite instructions from the educational institution. The text books are carefully prepared by specialists who not only know the subject matter but understand from first hand knowledge the needs and psychology of the average factory foreman. The course lasts twelve weeks. A group meeting is held at the end of each two weeks' study period. The foremen review the subject matter and learn to apply the matter to their local problems. The meetings are held after hours in a convenient place, usually furnished by the plant management. Where it is desirable by the men, the institution offers to conduct the meetings through its own lecture staff.

Along with the texts the men are furnished practical factory problems which they are to return with the solutions to the office of the institution within a stated time.

Combine Theory with Practice

The chief advantage of such a course is that it combines the lecture method with individual study and teaching supervision. The texts are based on the best production methods taken from the experiences of many manufacturing plants in a variety of industries. The individual problems prove an incentive to thinking and initiative in tackling local management problems. The foremen develop a technique of their own for solving such problems. Since the study courses are supervised by plant executives, directly or indirectly, the outside educational institution is instrumental in training intelligent plant instructors, and that is something that is of more than temporary value to the plant management.

The plant management finances the course of study by advancing the cash payment per man, but later collects one-half of the sum from the foreman. An arrangement generally entered in is to refund whatever payment the foreman made just as soon as he earns a certificate for satisfactory completion of the course, which means that in the long run the foreman pays nothing.

Whether conducted by an outside organization or by the plant management proper, the group study plan seems to be the most effective and the one in most common use. The foremen are formed into definite groups, either according to department, experience, study requirements, or to suit the personal convenience of the students. The group meets at definite intervals, either on company time or after the workday, and it is led either by a paid instructor or by a leader chosen from among the executives by the men or the management. The course is outlined and followed with a definite aim in view. Group study also involves some study on the outside, such as text reading, solving problems and applying specific rules to the job in the factory.

Standardizing Group Study

The methods of conducting groups differ, and it is for this reason that the Federal Board for Vocational Education has made efforts to effect some sort of standardization of group study and

to assist the management to conduct such courses without outside assistance. A definite program of study was drawn up and tried out in a representative plant. The Federal Board for Vocational Education plan is flexible in its application to a variety of plants and industries. In fact, it has been criticised on this point. In the words of one critic, "It is so free and easy in its methods that only the exceptional foreman can be brought to make the most of it." Sponsors of the plan defend it on the ground that it is merely an outline of a course to guide in the planning and management of groups in almost any industry, but that the detailed execution of the course and the application of the proper pedagogy are matters that rest with the management, the instructor and the group.

The Federal Board for Vocational Education outlined subject matter for eighty-two group meetings of two hours each. The foreman student is not called on to cover the entire ground, but only as much of the subject should be included in a single course to meet local requirements. The subject matter is, therefore, grouped in units. The Board suggests that each student give from four to six hours per week outside of meetings for completion of the work started in the class or group meeting. The outline serves as a guide for discussion by individual foremen. By following the plan it is possible for a group of foremen to conduct a definite course of study without outside leadership, except for supervision of the group by one who occupies the position of parliamentary chairman.

And then there is the group study plan executed entirely by the management, in which case the course of study is planned in its entirety by someone in the organization experienced in such work.

Whether the group study plan proves entirely successful is questioned by many, on the ground that one or two gifted foremen will monopolize the discussions at the expense of others who are not so responsive to discussion and yet need the training most. This can be overcome by proper planning and leadership and the choice of an experienced instructor or leader. This is a matter for the management to decide.

It was ash day. Pat and Mike were obliged to halt their heavily loaded cart to make way for a funeral. Gazing at the procession, Pat suddenly remarked:

"Mike, I wish I knew where I was going to die. I'd give a thousand dollars to know where I'm going to die."

"Well, Pat, what good would it do if you knew?"

"Lots," said Pat, "shure I'd niver go near that place."
—*National Monthly.*